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ABSTRACT

Data is presented which demonstrates that poor and/or nonwhite pregnant adolescents are high risk individuals from medical, educational and social points of view. Specific problems in all three areas are described and the results of a program, initiated to offer meaningful solutions, are discussed. The Young Mothers Educational Development (YMED) program was set up to provide intensive medical, psychological services for low income, pregnant adolescents and their infants. All services were combined under one roof in an effort to provide a comprehensive, meaningful, yet non-clinic type, program. Obstetrical, social and educational data was collected. An effort was made to assess infants' behavioral style and mother-child interaction. General results in all areas were encouraging: (1) incidence of premature and small-for-dates infants was reduced; (2) the educational success rate was high; and (3) social service data, were favorable. The infant and mother-infant interaction data were viewed as baselines for future investigations into developmental problems. The report concluded that much of the previously discussed risk of low-income, teen-age pregnancies can be removed when appropriate professional services are made available. (TL)

ADOLESCENTS AS MOTHERS: RESULTS OF A PROGRAM FOR LOW INCOME PREGNANT TEEN_AGERS WITH SOME EMPHASIS UPON INFANTS' DEVELOPMENT[1]

by

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There is at present a considerable body of data which demonstrates that pregnant adolescents, and especially those who are economically poor, and/or non-white, represent high risk individuals from medical, educational, and social points of view.[21] Complications of pregnancy, including anemia, toxemia, urinary tract infection, and indicated Cesarean section are commonly reported to occur more frequently within this group than within the general population.[2,3,7,14,27,29,34,35,39] Of ominous portent, prematurity, fetal and neonatal mortality, and even maternal mortality occur with far greater frequency within this subgroup of the population. Similarly, these teen-agers often have a poor educational prognosis. There is frequently a long history of disinterest, repeated school absence, and truancy. Partially related to being inner-city residents, the girls are often far below grade level.[6,8,9] With the pregnancy, in most areas of the country they are excluded from school for periods of up to 1½ years; in some areas, permanent exclusion is mandatory.[5,16,38] Given their prior history, their inner-city backgraounds, and the length of their exclusion, return success rates are very poor.

Social service data are equally alarming. In a recent report, Krantz cited national figures indicating that the typical girl who became pregnant out-of wedlock in her teens and required welfare assistance might be expected to deliver 9 out-cf-wedlock pregnancies during her reproduc-

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tive years and that the cost to the welfare department over the course of the girl's lifetime would average $100,000.[19] This figure does not include additional costs for the children - such as special education within the school system. Further corroborating this data is a report from New Haven demonstrating that of 100 clinic girls who were pregnant at age 15 and followed for 5 years, the average number of deliveries during the time of study was 3.4, almost all out-of-wedlock.[33] Only 5 percent of the girls in the study had no repeat pregnancy. In spite of such figures which indicate a forced cycle of individual poverty, a discontinuation of meaningful education, and a repetition of frequently undesired pregnancies, national reviews have indicated that few poor, and/or non-white, girls have received significant counseling.[1,4,15,31,36] Traditionally, where counseling has existed for such individuals, it has consisted of planning for welfare assistance. Adoption has seldom been offered as an alternative. Welfare workers have even suggested termination of both education and work outside of the home.

In addition, the surviving infants of low income and/or non-white pregnant adolescents appear to be in considerable jeopardy. As has been pointed out, there is a much higher incidence of both prematurity and small-for-dates infants in pregnancies occuring within the teen-age population. Knobloch and Pasamanick,[17,18,28,29] in the United States, and Drillien,[10,11] in Scotland, have in extensive studies found a considerably increased incidence of both mental subnormality and neurological deficit in surviving premature infants. When birth weight is 3 pounds or less, as high as 20 percent of all infants may require subsequent special schooling or institutionalization. Although the figures are not as striking for small-for-dates infants, the incidence of developmental problems and retardation are higher among this group than among the population at large. However, the prematurity and small-for-dates size do not per se account for all the developmental problems. Drillien has demonstrated that by age 5 most premature infants in middle and upper socioeconomic classes have caught up with their peers.[11] Where social

conditions are not as favorable, however, the incidence of persistent problems tends to increase. Conditions which tend to adversely affect the prognosis include deprived socioeconomic environment, other small offspring in the family, overcrowding of the home, and illegitimacy; obviously, many of these factors accompany low income teen-age pregnancies. Further, among those infants delivered at apparently normal maturity, there still appears to be an increased incidence of problems. Pakter has found infant death rates due to respiratory infections and accidents to be more than twice as common among infants born out-of-wedlock than among infants delivered to married mothers.[26] Pasamanick and Knobloch, in their studies of childhood developmental problems, have singled out pregnancies in low socioeconomic groups - and especially in low socioeconomic teen-age populations - as placing the infants in great jeopardy, even when prematurity is not a factor.[18,29]

The present report will describe the results of a program which was initiated in order to offer some meaningful solutions to the multiple medical, educational, and social problems of low income pregnant teenagers and their offspring. Previous articles have focused upon a description of the program together with early results.[22,23,24,25] Little data was available concerning the developmental outcome for the surviving infants. This report will provide considerable additional general information and will also focus upon the infants and their growth and development.

DESCRIPTION OF THE PROGRAM

The YMED program (Young Mothers Educational Development) was set up in Syracuse and Onondaga County in the fall of 1965 in an attempt to provide intensive medical, educational, social, and psychological services for low income, pregnant adolescents and their infants. From the onset, the program was interdisciplinary. It was conceived and jointly sponsored by the State University of New York, Upstate Medical Center at Syracuse, the Syracuse Board of Education, and the Onondaga County Department of Health. In more recent years, additional services were added by the Onondaga County Department of Social Services, Syracuse University, and Cornell University. YMED was designed to cut across professional lines and to offer individual services based upon the multiple skills available. The program was concerned at all times with the individuals being served, and an intensive effort was made to provide mothers and infants with maximum opportunities to lead useful, productive, and fulfilled lives within society.

The YMED program was set up in a school building which had previously been closed to usual school function. The school was selected for three reasons. The first was that a traditional school would have been unacceptable to the parents of non-pregnant schoolgirls and to the community; in New York State, as elsewhere, schoolgirls are usually excluded from classes when pregnancy is apparent. The second was its close proximity to the Medical Center. It was felt that since the girls were pregnant and going to school, and since medical care was to be an important part of the program, hospital and laboratory facilities should be available at all times. The third was related to the differences in meaning for teen-agers between a hospital and a school. It was hoped that a school building would avoid the usual medical and social stigmata associated with teen-age pregnancy and might encourage the girls to seek out meaningful comprehensive care earlier in their pregnancy. Within the portion of the school devoted to YMED, rooms were utilized as classrooms, social service and psychological offices, a cooperative kitchen and cafeteria, a medical facility for examination and prenatal observation, and a nursery facility for infants (the nursery facility was provided so that mothers might both continue attending school after the delivery of their

offspring, and, at the same time learn meaningful techniques of child care). Although combining such facilities under one roof was most non-traditional, it was felt that such a combination was absolutely necessary if a meaningful program was to be offered.

From its inception, YMED was visualized as a highly intensive and personalized effort. A clinic type situation was to be avoided; girls were to know and have individual relationships with the staff members who were providing the services. Girls were to have knowledge of their reproductive function and postpartally were to have all contraceptive options. Individualized planning was to be accorded each individual from the time she entered the program and flexibility was to be utilized in determining her duration of stay. In addition, follow-up and future planning were to receive high priority.

Since the onset of the program, 385 girls have been fully enrolled. Another 75 were partially enrolled during the early months of the program, before full services were available. 325 girls have to date delivered a total of 327 infants (2 sets of twins) within the program. An average of 3 to 5 new girls enter the program each week. The girls have ranged in age from 10 to 20 years at the time of entry into the program; the ~~main~~ mean age has been 16 years, 3 months. 61.2 percent of the girls have been non-white; 37.8 percent white; and 1 percent American Indian. Almost all of the girls have been economically poor. Approximately 75 percent have required full welfare assistance; and additional 10 percent have required partial welfare support.

METHOD

In order to better understand the problems, strengths, and weaknesses of this group, and in order to better isolate factors related to the prognosis and risk to the mothers and babies, much obstetrical (including nutritional and endocrinological), social, and educational data has been collected both during pregnancy and following delivery. Some of this data has been selected for the present report in order to give a pertinent overview of the results of the program and in order to possibly provide more weight into the meaning of the developmental data.

All of the infants are followed on a well and sick baby basis during the first year of life. Routine visits take place at monthly intervals for the first 6 months and at 3 month intervals thereafter. During the past 1½ years standardized measurements of length and weight have been obtained at 1, 3, 6, 9, and 12 months as part of these examinations. Because of their importance as measures of physical development, they will be included in the report.

In order to better understand infant development and mother-infant interaction, as well as to gather baseline information and develop useful tools for an improved infant care center, a major effort was made to assess infants' behavioral style and mother-infant interaction beginning in August, 1969. Infants and mothers were observed and videotaped at all pediatric visits before and during the examination. Nurses and doctors cooperated by leaving the mother alone with her infant during a specified period prior to the examination and by having the mother actively participate with her own infant during the examination. The variables utilized to evaluate infant style and mother-infant interaction included both measures which were previously developed and used to describe characteristics considered important for child development,[12,32] and related measures developed specifically for use in the present study.[20] Infant behavior was rated on a 5 point scale for the amount of:

1. Activity - an index of the amount of movement of arms, legs, and body.

2. Responsivity - an index of change in behavior to a stimulus, measuring the magnitude of change, not the direction. Includes verbal responses, limb movements, and postural change.

3. Affectivity - an index of the amount of facial expression the infant displays including smiling, and the amount of vocalization the infant emits.

Mothers' behavior was rated on a 5 point scale for amount of:

1. Verbal interaction with the child - an index of the mothers' talking to and communicating with the infant. Functional speech is differentiated from that designed to stimulate.

2. Physical interaction with the child - an index of mother's touching and general contact with the child, again differentiating functional touching from that designed to stimulate.

3. Warmth - a subjective measure of the amount and intensity of mother's emotional affective reactions and of her responsiveness to child's general and specific needs.

After an initial pilot study, 60 consecutive infants and mothers were evaluated. Inter-rater reliability for the measures utilized was .94.

RESULTS

A. General:

The general results of the program in all areas appear encouraging. They are summarized in Table I. The majority of girls have been seen early in the course of pregnancy with 50 percent receiving medical care by the 20th week of pregnancy. The average number of prenatal visits has been 11 per girl. Perhaps related to the intensive care, the incidence of major complications of pregnancy has been markedly reduced as compared to national figures for comparable populations. The combined incidence of premature and small-for-dates infants has been 12.5 percent. This is considerably below the 23.4 percent incidence of prematurity among mothers younger than 15, and the 18.3 percent figure for 15 through 19 year old mothers in Baltimore between 1951 and 1960.[3] Of considerable significance, there have been only 3 perinatal mortalities among the entire group. This rate is lower than that which would be expected within a privileged middle-class adult population.

Educationally the success rate has been high. Many underachieving students have responded with gains of 2 to 3 years of skill with 1 year of instruction. In 1968, 24 girls received high school diplomas related to attendance at YMED; in 1969, this figure was 31. Approximately 10 percent of all black high school graduates in the city of Syracuse during these 2 years received education at the program. Approximately 40 percent of all the girls graduating have elected some form of post high school education. The over-whelming majority of girls have been functioning well within either an educational or work program.

Social service data, as compiled in conjunction with other disciplines, have been equally encouraging. Of the girls enrolled in the program during the school years 1967 through 1969, only 13 percent are currently at home with their infants - without meaningful education, work, or marriage - and receiving welfare assistance. In a study of the first 193 consecutive girls delivering at the program, some of whom were followed up to 3 years postdelivery, it was found that only 38 had become pregnant again. Of this figure, 22 had married in the interim and only 16 were single at the time of the new conception. These figures would indicate a projected diminution in repeat unwanted pregnancies of at least two-thirds and possibly even more when compared with the figures cited earlier.

It should be emphasized that although the results are most encouraging there still exist many areas of concern. Some complications of pregnancy, including bacilluria, mild toxemia, and even gonorrhea have occurred with greater frequency than would be expected among the population at large. Considering the youthfulness of the patients, and the supposed good health which should accompany the onset of pregnancy, the incidence of anemia has been disturbing. 52 percent of the girls have had a hemoglobin below 11.5 during pregnancy. 21 percent had had a hemoglobin below 10. Although the combined incidences of prematurity and small-for-dates infants have been reduced, they still do not approach optimal levels; and the average birth weight of all infants in the program is 11 ounces below the national average. These figures are unrelated to the race of the mother.

B. The Physical Growth and Development of the Infants:

In light of the data demonstrating a somewhat increased incidence of premature and small-for-dates infants, and an everage reduced birth weight for all infants in the program, it is of special interest to examine the data related to physical growth and development during the first year of life. The information is summarized in Table II. At 1 month of age, 74 percent of the infants are below the 50th percentile in weight and 76.9 percent in length. At 3 months the figures have improved considerably, and by 6 months the infants resemble the population at large. Only 46.5 percent are below the 50th percentile in weight

and 47.6 percent in length. Of some interest, they then begin to fall behind again. At 9 months a greater number are below the 50th percentile in each category, and by 1 year of age even more are behind - 61.6 percent in weight and 61.8 percent in length.

C. Ratings of Mothers and Infants' Behavior before and during the Pediatric Examination:

Mean ratings of mothers and infants' behavior before and during the pediatric examination are shown in Table II. These ratings have been made on the dimensions defined in the methods section, with a score of 1 indicating the lowest and a score of 5 the highest obtainable. Some interesting differences have emerged from these ratings. As can be noted, the mothers appear to exhibit a relatively high amount of warmth and physical interaction with their infants. At the same time, they exhibit relatively little verbal interaction with their infants, with the scores on this measure averaging only 2.15. The infants similarly demonstrate variability in the behavioral measures studied. They score relatively high on measures of activity. However, on both the ratings of affectivity and responsivity they score considerably lower. Differences between means on the dimensions have not been tested because the scaling for variables may not be completely equivalent, since each measures different behaviors.

DISCUSSION

The previous sections have presented a brief description of an interdisciplinary program for pregnant teen-agers, a summary of its results to date, and a presentation of some data concerning both infant growth and development and the mother-child interaction. The body of data would seem to lead to some rethinking of traditional concepts as well as to the raising of questions which must, for the present, go unanswered.

Pregnant teen-agers, and especially those who are economically poor and/or non-white, have traditionally represented high risk individuals in many ways. Their medical prognosis have been poor. School achievement has been limited. Roles in the community have been disappointing - with low productivity and high community expense being frequently encountered.

The various professions involved have raised questions concerning the reasons for the risk and have frequently centered hypotheses upon ancestral background, psychological difficulty, motivational problems, age-specific difficulties to name but a few. Certainly some of the cited reasons may play a role in individual cases.

However, an equally important set of issues has frequently been ignored. The medical community has often offered less than truly professional care to the poor. Traditional services have been impersonal and inadequate. Social services have usually been almost non-existent. Counseling, especially for the poor and non-white, has been extremely sparse, and has sometimes even been detrimental and punitive. The educational profession has excluded girls from school. This has been done in spite of the girls having, if anything, increased needs because of prior attendance at inadequate inner-city schools.

What YMED, and other programs like it, demonstrate is that given a reasonable - and not too costly - opportunity, individuals who are at high risk and who are supposedly disinterested will respond. Most individuals will take advantage of the offered options. Medical complications, prematurity, and even perinatal mortality will be considerably reduced. In spite of problems of poverty, prior school deficiencies, and responsibilities for infant care, individuals will make considerable educational progress, and will frequently graduate high school and even continue for higher education. Where sex education and contraception are available, the incidence of unwanted repeat pregnancies will be strikingly reduced. Many individuals will leave local welfare rolls.

This does not mean that residual problems will not remain. As can be seen from the present study, many medical complications will continue to persist at a frequency which is relatively greater than that which would be expected within a more medically favored population. Some may be related to the state of adolescence with age-specific physiological and/or psychological complications. Others may be related to long-standing poverty and dietary inadequacy. Answers cannot be fully given at this time. However, there are at least clues implicating poverty and

resultant dietary inadequacy as playing a considerable role. As has been noted, there is an unusually high incidence of anemia during pregnancy, most of which is of an iron deficient variety. Further, the infants, average low in birth weight and a relatively high number are either premature or small-for-dates. All of these conditions are commonly found with poor maternal nutrition. It is therefore of interest that an ongoing study within the program is demonstrating that over 50 percent of the girls have diets considerably deficient in both protein and iron intake; the deficiencies are not infrequently the result of lack of finances for purchase of adequate foodstuffs.

The physical growth and development curves for the infants raise further questions. Infants who are below the 50th percentile at birth seem to catch up by the 6th month of age and then begin to fall behind again. Numerous explanations are possible related to constitutional, nutritional, and other environmental factors. It is at least interesting, however, to note that the catch-up occurs during the early months of life when the infants are primarily receiving formula and milk, both of which are readily available to the mothers. If poverty malnutrition were to play a role it might be logically expected to influence the infants at the time of birth and then again when household solid foods are introduced during the second 6 months of life. Such an hypothesis would be consistent with data indicating that over one-third of Negro children from low-income families have significant anemia at 6 months of age and that 84.8 percent of these children have hemoglobins below 10.5 at 12-17 months of age.[13] The present study cannot provide definitive answers in this area; further explorations are currently under way.

The ratings of maternal and infant behavior during the mother-child interaction situation, while exploratory, also appear to be of considerable interest. They suggest that young mothers may have both specific strengths and weaknesses. Although many workers have taken the latter for granted, little emphasis has been placed upon possible strengths related to the youthfulness and/or background of these mothers. The present study suggests that the mothers rate high on measures of warmth and physical

interaction. The low ratings on measures of verbal interaction may also be of considerable importance. It would be inappropriate to speculate widely upon this result at the present time, but further studies are being obtained to determine possible meaning and implications for child development.

The infant data is also of considerable interest. It provides baseline information for a previously little studied group. The directions of the results, with higher scores on the measure of activity and lower scores on the measures of responsivity and affectivity, could lead to speculations in a variety of areas, such as possible relationships to the observed maternal behavior, to prenatal and early infancy parameters, and to developmental prognosis, However, once again, any such speculations would appear premature. Longitudinal studies are currently under way to better assess the data and to define possible relationships.

In conclusion, it may be noted that much of the medical, educational, and social risk of low income teen-age pregnancies can be removed when appropriate professional services are made available. Both humanistic and societal indications would suggest the appropriateness and relevance of such services. At present, however, it should be noted that some residual baseline risk may be expected to persist following the major drop in complications which accompanies improved services. The relative roles of co-existing poverty, physiological maturational problems, and specific psychological issues related to adolescence, to name but a few, remain to be understood. The present investigation has attempted to shed some light upon this poorly understood area. In addition, exploratory findings related to the physical growth and development of the infants and the behaviors of the young mothers and their infants in an interaction situation have been presented. Although at present only a few implications can be drawn from these findings, it is suggested that they may serve as baselines for future investigation, which may shed light upon developmental problems, and which may be of assistance to those who deal with young mothers and their infants.

TABLE I

SUMMARY OF GENERAL RESULTS OF THE YMED PROGRAM

A. Medical (for 325 deliveries)	
Average number of prenatal visits	11
Percent with hemoglobin below 11.5	52
Percent of premature or small-for-dates deliveries	12.5
Number of perinatal deaths	3
B. Educational (1967-68 and 1968-69)	
High school graduates - 1968	24
High school graduates - 1969	31
Percent electing higher education	40
C. Social	
Percent requiring full or partial welfare assistance when entering program.	85
Percent of 1967-1969 students in neither school, employment, or marriage and requiring welfare assistance (follow-up).	13
Number of first 193 pregnant females with repeat pregnancy (up to 3 year follow-up).	38.

TABLE II

PHYSICAL GROWTH AND DEVELOPMENT OF INFANTS

PERCENT OF INFANTS BELOW 50TH PERCENTILE FOR WEIGHT AND LENGTH

Age of Infant (in mos.)	Weight		Length	
	Number Studied	Percent below 50th Percentile	Number Studied	Percent below 50th Percentile
1	135	74.0	130	76.9
3	134	56.9	129	69.7
6	101	46.5	126	47.6
9	68	55.9	95	57.9
12	52	61.6	55	61.8

TABLE III

RATINGS OF MOTHERS AND INFANTS' BEHAVIOR
BEFORE AND DURING PEDIATRIC EXAMINATION

1 = low; 5 = high

Mothers Ratings	Mean
Physical Interaction	3.23
Verbal Interaction	2.15
Warmth	3.52

Infant Ratings	Mean
Activity	3.31
Responsivity	2.83
Affectivity	2.84

Number of subjects in all groups = 60.

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